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ABSTRACT

Focusing on small business occupations, this document is one in a series of forty-one reprints from the Occupational Outlook Handbook providing current information and employment projections for individual occupations and industries through 1985. The specific occupations covered in this document include barbers, cosmetologists, funeral directors/embalmers, furniture upholsterers, jewelers, locksmiths, piano and organ tuners/repairers, shoe repairers, television and radio service technicians, and watch repairers. The following information is presented for each occupation or occupational area: a code number referenced to the Dictionary of Occupational Titles; a description of the nature of the work; places of employment; training, other qualifications, and advancement; employment outlook; earnings and working conditions; and sources of additional information. In addition to the forty-one reprints covering individual occupations or occupational areas (CE 017 757-797), a companion document (CE 017 756) presents employment projections for the total labor market and discusses the relationship between job prospects and education. (BM)

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ED158130

Small Business Occupations

Reprinted from the
Occupational Outlook Handbook,
1978-79 Edition.

U.S. Department of Labor
Bureau of Labor Statistics
1978

Bulletin 1955-26

Containing the midpoints of the legs of right triangle *RST*, wher pt. (−5, 5), *S* is pt. 1, 1), and pt. (3, 4).

Containing the longer diagonal of a quadrilateral whose vertic pts. (2, 2), (−2, −2), (1, −1), and (6, 4).

Show that the equations $y - 1 = \frac{1}{2}(x + 3)$ and $y - 4 = \frac{1}{2}(x$ are equivalent.

An equation of the line containing pts. (−2, 3) and (4, −1) c written in the form $y - 3 = -\frac{1}{2}(x + 2)$ or in the $y + 1 = -\frac{1}{2}(x - 4)$, depending upon which point you take (x_1, y_1). Show that the two equations are equivalent.

Show that the equations are equivalent.

$$y - y_1 = \frac{y_2 - y_1}{x_2 - x_1}(x - x_1) \qquad y - y_2 = \frac{y_1 - y_2}{x_1 - x_2}(x - x$$

State the equation of a line through pt. (p, q) and parallel to containing pts. (a, b) and (c, d). $(a \neq c)$.

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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CE 017 780

BARBERS

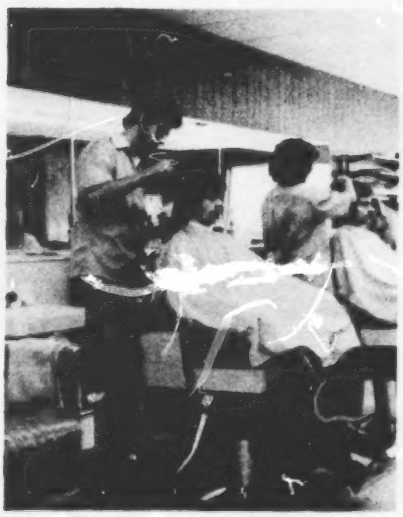
(D.O.T. 330.371)

Nature of the Work

Although most men go to a barber for just a haircut, other services such as hairstyling and coloring have become increasingly popular. Barbers trained in these areas are called "hairstylists" and work in styling salons, "unisex" salons, and some barbershops. They cut and style hair to suit each customer and may color or straighten hair and fit hair pieces. Most barbers offer hair and scalp treatments, shaves, facial massages, and shampoos.

A small but growing number of barbers cut and style women's hair. They usually work in unisex salons—shops that have male and female customers. Some States require a cosmetologist's license as well as a barber's license, however, to permanent wave or color women's hair.

As part of their responsibilities, barbers keep their scissors, combs, and other instruments sterilized and in good condition. They clean their work areas and may sweep the shop as well. Those who own or manage a shop have additional responsibilities such as ordering supplies, paying bills, keeping records, and hiring employees.



More than half of all barbers operate their own businesses.

Places of Employment

Most of the 124,000 barbers in 1976 worked in barbershops. Some worked in unisex salons, and a few worked for government agencies, hotels, or department stores. More than half of all barbers operated their own businesses.

Almost all cities and towns have barbershops, but employment is concentrated in the most populous cities and States. Hairstylists usually work in large cities where the greatest demand for their services exists.

Training, Other Qualifications, and Advancement

All States require barbers to be licensed. The qualifications necessary to get a license vary from one State to another, however. Generally a person must be a graduate of a State-approved barber school, have completed the eighth grade, pass a physical examination, and be at least 16 (in some States 18) years old.

Many States require a beginner to take an examination for an apprentice license, and serve 1 or 2 years as an apprentice before taking the examination required for a license as a registered barber. In the examinations, the applicant usually is required to pass a written test and demonstrate an ability to perform the basic services. Fees for these examinations range from $10 to $75.

Because most States do not recognize training, apprenticeship work, or licenses obtained in another State, persons who wish to become barbers should review the laws of the State in which they want to work before entering a barber school.

Barber training is offered in about 350 schools; 3 out of 4 barber schools are private. Some public high schools offer barbering in their vocational programs. Barber school programs usually last 9 to 12 months. Students buy their own tools, which cost about $200. They study the basic services—haircutting, shaving, facial massaging, and hair and scalp treatments—and, under supervision, practice on fellow students and on customers in school "clinics." Besides attending lectures on barber services and the use and care of instruments, students take courses in sanitation and hygiene, and learn how to recognize certain skin conditions. Instruction also is given in selling and general business practices. Advanced courses are available in some localities for barbers who wish to update their skills or specialize in hairstyling, coloring, and the sale and service of hairpieces.

Dealing with customers requires patience and a better than average disposition. Good health and stamina also are important because barbers stand a great deal and work with both hands at shoulder level—a position that can be tiring.

Beginners may get their first jobs through the barber school they attended, or through the local barber's union or employer's association.

Some experienced barbers advance by becoming managers of large shops or by opening their own shops. A few may teach at barber schools. Barbers who go into business for themselves must have the capital to buy or rent a shop and install equipment. New equipment for a one-chair shop cost from $1,500 to $3,000 in 1976. Some shopowners buy used equipment and fixtures at reduced prices, however.

Employment Outlook

The employment decline of the last decade is expected to level off by the mid-1980's as population growth and the increasing popularity of hairstyling offset the effect of the fashion for longer hair. Although little change is expected in the level of employment, several thousand job openings for barbers will occur each year because of the need to replace workers who retire, die, or transfer to other kinds of work. Replacement needs in barbering are high, compared with many other occupations.

The shift in consumer preferences from regular haircuts to more personalized and intensive services has greatly affected the occupation. Barbers who specialize in hairstyling have been much more successful than those who offer conventional services. This trend is expected to continue, and employment opportunities should be better for hairstylists than for regular barbers.

Earnings and Working Conditions

Barbers receive income from commissions or wages and tips. Most barbers who are not shopowners normally receive 60 to 70 percent of the money they take in; a few are paid straight salaries.

Weekly earnings of experienced barbers (including tips) generally ranged between $200 and $250 in 1976, according to limited information available. Hairstylists usually earned $315 to $400 a week, because the services they provide are more personalized and therefore more expensive. Some hairstylists and a few barbers who operated their own shops earned more than $400 a week. Beginning barbers usually earn about $175 to $200 a week, hairstylists $200 to $250 a week.

Earnings depend on the size and location of the shop, customers' tipping habits, competition from other barbershops, and the barber's ability to attract and hold regular customers.

Most full-time barbers work more than 40 hours a week and a workweek of over 50 hours is not uncommon. Although Saturdays and lunch hours are generally very busy, a barber may have some time off during slack periods. To assure an even workload, some barbers ask customers to make appointments. Some barbers receive 1- or 2-week paid vacations, insurance, and medical benefits.

The principal union that organizes barbers—both employees and shopowners—is the Journeymen Barbers, Hairdressers, Cosmetologists and Proprietors' International Union of America. The principal association that represents and organizes shopowners, managers, and employees is the Associated Master Barbers and Beauticians of America.

Sources of Additional Information

Lists of barber schools, by State, are available from:

National Association of Barber Schools, Inc., 338 Washington Ave., Huntington, W.Va. 25701.

National Association of Trade and Technical Schools, 2021 L St., NW., Room 440, Washington, D.C. 20036.

Every State maintains information on State licensing requirements and approved barber schools. For details, contact the State board of barber examiners or the equivalent authority at your State capital.

Additional information on this occupation is available from:

National Barber Career Center, 3839 White Plains Rd., Bronx, N.Y. 10467.

COSMETOLOGISTS

(D.O.T. 332.271 and .381; 331 and 339.371)

Nature of the Work

Hair has been a center of attention since women and men first began to care about their appearance. Throughout history a great deal of effort has gone into acquiring a fashionable hairstyle or a perfectly trimmed beard. Although styles change from year to year, the cosmetologist's task remains the same—to help people look attractive.

Cosmetologists, who also are called *beauty operators*, *hairstylists*, or *beauticians*, shampoo, cut, and style hair, and advise patrons on how to care for their hair. Frequently they straighten or permanent wave a patron's hair to keep the style in shape. Cosmetologists may also lighten or darken the color of the hair to better suit the patron's skin color. Cosmetologists may give manicures, scalp and facial treatments, provide makeup analysis for women, and clean and style wigs and hairpieces.

Most cosmetologists make appointments and keep records of hair color formulas and permanent waves used by their regular patrons. They also keep their work area clean and sanitize their hairdressing implements. Those who operate their own salons also have managerial duties which include hiring and supervising workers, keeping records, and ordering supplies.

Places of Employment

Most of the more than 534,000 cosmetologists employed in 1976 worked in beauty salons. Some worked in "unisex" shops, barber-styling shops, or department stores, and a few were employed by hospitals and hotels. More than one-third operated their own businesses.

All cities and towns have beauty salons, but employment is concentrated in the most populous cities and States. Those cosmetologists who set fashion trends with their hairstyles usually work in New York City, Los Angeles, and other centers of fashion and the performing arts.

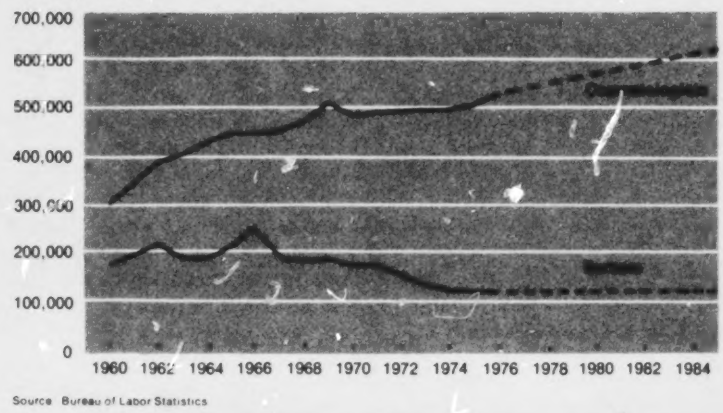
Training, Other Qualifications, and Advancement

Although all States require cosmetologists to be licensed, the qualifications necessary to obtain a license vary. Generally, a person must have graduated from a State-approved cosmetology school, have completed at least the 10th grade, pass a physical examination, and be at least 16 years old. In some States completion of an apprenticeship training program can substitute for graduation from a cosmetology school, but very few cosmetologists learn their skills in this way.

Cosmetology instruction is offered in both public and private vocational schools, in either daytime or evening classes. A daytime course usually takes 9 months to 1 year to complete; an evening course takes longer. Many public school programs include the academic subjects needed for a high school diploma and last 2 to 3 years. An apprenticeship program usually lasts 1 or 2 years.

Both public and private programs include classroom study, demonstrations, and practical work. Most schools provide students with the necessary hairdressing implements, such as manicure implements, combs, scissors, razors, and hair rollers, and include their cost in the tuition fee. Sometimes students must purchase their own. A good set of implements costs over $50. Beginning students work on manikins or on each other. Once they have gained

Changing hairstyles have caused a drop in employment of barbers, but cosmetology has continued to grow



Source: Bureau of Labor Statistics

some experience, students practice on patrons in school "clinics."

After graduating from a cosmetology course, students take the State licensing examination. The examination consists of a written test and a practical test in which applicants demonstrate their ability to provide the required services. In some States an oral examination is included and the applicant is asked to explain the procedures he or she is following while taking the practical test. In some States a separate examination is given for persons who want only a manicurist's license. Some States have reciprocity agreements that allow a cosmetologist licensed in one State to work in another without reexamination.

Persons who want to become cosmetologists must have finger dexterity, a sense of form and artistry, and the physical stamina to stand for long periods of time. They should enjoy dealing with the public and be willing and able to follow patrons' instructions. Because hairstyles are constantly changing, cosmetologists must keep abreast of the latest fashions and beauty techniques. Business skills are important for those who plan to operate their own salons.

Many schools help their students find jobs. During their first months on the job, new cosmetologists are given relatively simple tasks, such as giving manicures or shampoos, or are assigned to perform the simpler hairstyling patterns. Once they have demonstrated their skills, they are gradually permitted to perform the more complicated styling tasks such as hair coloring and permanent waving.

Advancement usually is in the form of higher earnings as cosmetologists gain experience and build a steady clientele; but many manage large salons or open their own after several years of experience. Some teach in cosmetology schools or use their knowledge and skill to demonstrate cosmetics in department stores. A few work as examiners for State cosmetology boards.

Cosmetologists must keep up with the latest fashions.

Employment Outlook

Employment of cosmetologists is expected to grow about as fast as the average for all occupations through the mid-1980's as population increases and the number of working women rises. The trend to hairstyling for men also creates a demand for these workers because many men go to unisex shops or beauty salons for styling services. In addition to openings due to growth in the occupation, thousands of cosmetologists will be needed each year to replace those who die, retire, or leave the occupation.

Employment in this occupation is not strongly affected by downturns in the business cycle, and job opportunities are expected to be good for both newcomers and experienced cosmetologists. Many openings should be available for persons seeking part-time work.

Earnings and Working Conditions

Cosmetologists receive income from commissions or wages and from tips. Those who are not salon owners receive a percentage of the money they take in, usually 50 percent; a few are paid straight salaries.

Weekly earnings of experienced cosmetologists (including tips) generally ranged between $285 and $340 in 1976, according to limited information available. After 10 years of experience, they can earn more than $450 a week. Beginners usually earned $95 to $125 a week. Those cosmetologists who cut and style men's hair often earn more than those who work on women's hair because the services they provide are more expensive.

Earnings also depend on the size and location of the salon, patrons' tipping habits, competition from other beauty salons, and the individual cosmetologist's ability to attract and hold regular patrons.

Many full-time cosmetologists work more than 40 hours a week, including evenings and Saturdays when beauty salons are busiest. More than one-third of all cosmetologists work part time, usually during these busy hours.

A few large salons and department stores offer group life and health insurance and other benefit plans. Nearly all employers provide annual paid vacations of at least 1 week after a year's service.

The principal union which organizes cosmetologists—both employees and salon owners—is the Journeymen Barbers, Hairdressers, Cosmetologists, and Proprietor's International Union of America. The principal trade association which represents and organizes salon owners, managers, and employees is the Associated Master Barbers and Beauticians of America. Other organizations include the National Hairdressers and Cosmetologists Association, Inc.; the National Association of Cosmetology Schools, Inc., which represents school owners and teachers; and the National Beauty Culturists' League, representing black cosmetologists, teachers, managers, and salon owners.

Sources of Additional Information

A list of approved training schools and licensing requirements can be obtained from State boards of cosmetology or from:

Cosmetology Accrediting Commission, 1707 L Street, N.W., Room 440, Washington, D.C. 20036

Additional information about careers in cosmetology and State licensing requirements is available from:

National Beauty Career Center, 3839 White Plains Rd., Bronx, N.Y. 19467.

National Hairdressers and Cosmetologists Association, 3510 Olive St., St. Louis, Mo. 63103.

For general information about the occupation, contact:

Journeymen Barbers, Hairdressers, Cosmetologists, and Proprietors International Union of America, 7050 West Washington St., Indianapolis, Ind. 46241.

National Association of Cosmetology Schools, 599 South Livingston Ave., Livingston, N.J. 07039.

FUNERAL DIRECTORS AND EMBALMERS

(D.O.T. 187.168 and 338.381)

Nature of the Work

Few occupations require the tact, discretion, and compassion called for in the work of funeral directors and embalmers. The family and friends of the deceased may be under considerable emotional stress and bewildered by the many details of the occasion. The *funeral director* (D.O.T. 187.168) helps them to make the personal and business arrangements necessary for the service and burial. The *embalmer* (D.O.T. 338.381) prepares the body for viewing and burial. In many instances, one person performs both functions.

The director's duties begin when a call is received from a family requesting services. After arranging for the deceased to be removed to the funeral home, the director obtains the information needed for the death certificate, such as date and place of birth and cause of death. The director makes an appointment with the family to discuss the details of the funeral. These include time and place of service, clergy and organist, selection of casket and clothing, and provision for burial or cremation. Directors also make arrangements with the cemetery, place obituary notices in newspapers, and take care of other details as necessary. Directors must be familiar with the funeral and burial customs of various religious faiths and fraternal organizations.

Embalming is a sanitary, preservative and cosmetic measure. Embalmers, perhaps with the help of apprentices, first wash the body with germicidal soap. The embalming process itself replaces the blood with a preservative fluid. Embalmers apply cosmetics to give the body a natural appearance and, if necessary, restore disfigured features. Finally, they dress the body and place it in the casket selected by the family.

On the day of the funeral, directors provide cars for the family and pallbearers, receive and usher guests to their seats, and organize the funeral procession. After the service they may help the family file claims for social security, insurance, and other benefits. Directors may serve a family for several months following the funeral until such matters are satisfactorily completed.

Places of Employment

About 45,000 persons were licensed as funeral directors and embalmers in 1976. A substantial number of the directors were funeral home owners.

Most of the 22,000 funeral homes in 1976 had 1 to 3 directors and embalmers, including the owner. Many large homes, however, had 20 or more. Besides the embalmers employed by funeral homes, several hundred worked for morgues and hospitals.

Training, Other Qualifications, and Advancement

A license is needed to practice embalming. State licensing standards vary but generally an embalmer must be 21 years old, have a high school diploma or its equivalent, graduate from a mortuary science school, serve an apprenticeship, and pass a State board examination. One-half of the States require a year or more of college in addition to training in mortuary science.

All but six States also require funeral directors to be licensed. Qualifications are similar to those for embalmers but directors may have to take special apprenticeship training and board examinations. Most people entering the field obtain both licenses, however some States issue a single license to embalmer/funeral directors. Information on licensing requirements is available from the State office of occupational licensing.

High school students can start preparing for a career in this field by taking courses in biology, chemistry, and speech. Students may find a part-time or summer job in a funeral home. Although these jobs consist mostly of maintenance and clean-up tasks, such as washing and polishing hearses, they can be helpful in gain-

ing familiarity with the operation of funeral homes.

In 1976, 34 schools had mortuary science programs accredited by the American Board of Funeral Service Education. About one-half were private vocational schools that offer 1-year programs emphasizing basic subjects such as anatomy and physiology as well as practical skills such as embalming techniques and restorative art. Community colleges offer 2-year programs, and a small number of colleges and universities offer 2- and 4-year programs in funeral service. These programs included liberal arts and management courses as well as mortuary science. All programs offered courses in psychology, accounting, and funeral law.

Apprentices work under the guidance of experienced embalmers and directors. An apprenticeship usually lasts 1 or 2 years and may be served before, after, or during the time one attends mortuary school, depending on State regulations.

State board examinations consist of written and oral tests and actual demonstration of skills. After passing the examination and meeting other requirements, apprentices receive a license to practice. If they want to work in another State, they may have to pass its examination, although many States have mutual agreements that make this unnecessary.

Important personal traits for funeral directors are composure, tact, and the ability to communicate easily with the public. They also should have the desire and ability to comfort people in their time of sorrow.

Advancement opportunities are best in large funeral homes where directors and embalmers may earn promotion to higher paying positions such as personnel manager or general manager. Some workers eventually acquire enough money and experience to establish their own businesses.

Employment Outlook

Little change in the employment of funeral directors and embalmers is expected through the mid-1980's. In recent years, the number of mortuary school graduates has approximately equaled the number of jobs available due to retirements, deaths, and transfers to other occupations. Many students secure a promise of employment before entering a program and, barring any significant growth in enrollments, future graduates should find job opportunities available.

Demand for funeral services will rise as the population grows and deaths increase. Most funeral homes, however, will be able to meet the demand without expanding their employment. The average funeral home conducts only one or two funerals each week and is capable of handling several more without hiring additional employees.

Earnings and Working Conditions

In 1976, funeral directors and embalmers generally earned from $200 to $300 a week. Managers generally earned between $10,000 and $16,000 a year, and many owners earned more than $20,000. Apprentices earned between $2.25 and $4.60 an hour.

In large funeral homes, employees usually have a regular work schedule. Typically they put in 8 hours a day, 5 or 6 days a week. Overtime, however, occasionally may be necessary. Some employees work shifts; for example, nights 1 week, and days the next.

Occasionally embalmers may come into contact with contagious diseases but the possibility of their becoming ill is remote, even less likely than for a doctor or nurse.

Sources of Additional Information

Information about job opportunities in this field is available from local funeral homes and from:

National Funeral Directors Association of the United States, Inc., 135 W. Wells St., Milwaukee, Wisc. 53203.

National Selected Morticians, 1616 Central St., Evanston, Ill. 60201.

For a list of accredited schools of mortuary science and information about scholarship opportunities, contact:

The American Board of Funeral Service Education, Inc., 201 Columbia St., Fairmont, W. Va. 26554.

FURNITURE UPHOLSTERERS

(D.O.T. 780.381)

Nature of the Work

Whether restoring a treasured antique or simply giving an old living room couch a facelift, upholsterers combine artistic flair and skill to recondition sofas, chairs, and other upholstered furniture. These craft workers repair or replace fabrics, springs, padding, and other parts that are worn or damaged. (Workers employed in the manufacture of upholstered furniture are not included in this statement.)

The tasks involved in upholstering any piece of furniture are basically the same, although each job is unique in some ways because of differences in furniture construction. As the first step, upholsterers usually place the furniture on padded wooden benches or some other type of support so that they may work at a convenient level. Using hammers and tack pullers, they remove tacks holding the old fabric to the wooden frame. After stripping the old fabric, they remove the burlap and padding that cover the springs. Upholsterers examine the springs and remove broken or bent ones. If the nylon or cotton webbing—which hold the springs in place—is worn, upholsterers remove all the springs and all the webbing.

To rebuild the furniture, upholsterers may reglue loose sections of the frame and refinish exposed wooden parts. They then tack webbing to one side of the frame, stretch it tight, and tack it to the opposite side. Other webbing is woven across the first and attached to the frame in a similar fashion to form a mat. After putting springs on the mat so they compress evenly, upholsterers sew or staple each spring to the webbing or frame and tie each spring to the ones next to it. Burlap then is stretched over the springs, cut and smoothed, and tacked to the frame. To form a smooth rounded surface over the springs and frame, upholsterers cover all surfaces of the furniture with foam rubber, cotton pads, or other filling material. After sewing the pad-

ding to the burlap, they cover it with heavy cloth and tack the cloth to the frame. Finally, upholsterers put the new fabric cover, which has been cut to size and temporarily stitched together for fitting, on the furniture. After checking that the cover fits tightly and smoothly—or noting where adjustments are necessary—they remove the cover and sew it together. To complete the job, upholsterers put the cover back on the furniture; sew or tack on fringe, buttons, or other ornaments; and make pillow covers.

Upholsterers use a variety of handtools including tack and staple removers, pliers, hammers, and hand or power shears. They use special tools such as webbing stretchers and upholstery needles. They also use sewing machines.

Sometimes upholsterers pick up and deliver furniture. Those who own and manage shops order supplies and equipment and keep business records.

Places of Employment

About 27,000 people worked as furniture upholsterers in 1976. Over three-fourths of all furniture upholsterers own and operate, or work in small upholstery shops. These shops generally have less than three workers. Some upholsterers are employed by furniture stores. A few work for businesses, such as hotels, that maintain their own furniture.

Over three-fourths of all furniture upholsterers own and operate, or work in, small upholstery shops.

Upholsterers work in all parts of the country. However, employment is concentrated in metropolitan areas, where the large population provides the greatest demand for the upholsterer's services.

Training, Other Qualifications, and Advancement

The most common way to enter this trade is to start as a helper in an upholstery shop and learn on the job. Helpers learn by upholstering furniture under the direction of experienced workers. Much time and practice are needed to learn complex tasks such as measuring and cutting the new fabric and sewing and attaching it to the frame with a minimum of waste. Usually about 3 years of on-the-job training are required to become a fully skilled upholsterer.

Inexperienced persons may get valuable training from vocational or high school courses in upholstery. However, additional training and experience in a shop are usually required before these workers can qualify as skilled upholsterers. In a few large cities, locals of the Upholsterers' International Union of North America run formal apprenticeship programs that last from 3 to 4 years. The programs place graduates of local vocational schools in upholstery shops where they receive on-the-job training.

Persons interested in becoming upholsterers should have good manual dexterity, coordination, and be able to do occasional heavy lifting. An eye for detail, good color sense, patience, and a flair for creative work are helpful in making upholstered furniture as attractive as possible.

The major form of advancement for upholsterers is opening their own shop. It is easy to open a shop because only a small investment in handtools is needed. However, the business is extremely competitive, so operating a shop successfully is difficult.

Employment Outlook

Little or no change is expected in employment of upholsterers through the mid-1980's. Most job openings will arise because of the need to replace experienced workers who retire, die, or transfer to other occupations.

More upholstered furniture will be used as population, personal income, and business expenditures grow. However, the demand for upholsterers will be limited because more people are buying less expensive furniture and replacing rather than reupholstering it.

Earnings and Working Conditions

Hourly wages for experienced furniture upholsterers ranged from $4.25 to $8 in 1976. Some highly skilled upholsterers earned over $10 an hour. Wages for inexperienced trainees ranged from $2.50 to $4 an hour. Upholsterers generally work 40 hours a week.

Working conditions in upholstery shops vary—many shops are spacious, adequately lighted, well-ventilated, and well-heated; others are small and dusty. Upholsterers stand while they work and do a considerable amount of stooping and bending and some heavy lifting.

Upholsterers usually buy their own handtools; employers provide power tools.

Some upholsterers are members of the Upholsterers' International Union of North America.

Sources of Additional Information

For more details about work opportunities for upholsterers, contact local upholstery shops or the local office of the State employment service.

JEWELERS

(D.O.T. 700.281 and .381)

Nature of the Work

For centuries people have adorned themselves with rings, necklaces, and

other ornaments made from precious metals and stones. The creation and repair of such beautiful items is the work of a jeweler.

Generally jewelers specialize in a particular manufacturing operation such as designing, modelmaking, stone setting, or engraving. Some specialize in repair work such as enlarging and reducing rings, resetting stones, soldering broken parts, or redesigning old jewelry.

The method of producing jewelry varies with the item made and materials used. For special orders, jewelers follow either their own designs or those created by designers. They outline the design on metal such as gold or silver, and then cut, fit, and shape each part. After preparatory polishing, they solder parts together to form the finished piece. Designs are carved in the metal and diamonds or other precious stones are mounted.

Costume jewelry and some kinds of precious jewelry are mass produced by factory workers using assembly line methods. The metal usually is melted and cast in a mold or shaped with a die. Skilled jewelers are needed, however, to design and make the molds and the dies, cast the jewelry pieces, and perform finishing operations, such as polishing, engraving and stone setting.

In their work jewelers use files, saws, hammers, punches, soldering irons, and a variety of other small handtools. Because the work is very detailed, jewelers often use a magnifying glass or eye "loupe."

Some jewelers own jewelry stores or shops that make and repair jewelry. In addition to working on jewelry, these small business people hire employees, order and sell merchandise, and handle other managerial duties.

Places of Employment

About 19,000 people had jobs as jewelers in 1976, one-third of whom were self-employed and owned retail jewelry stores and repair shops. About one out of every eight jewelers worked in a jewelry store. The remainder were about evenly distributed between jewelry factories and repair shops.

Most jewelers employed in precious jewelry production worked in or near New York City. Although jewelry stores and repair shops are located throughout the country, most jobs in these establishments are in metropolitan areas.

Jewelers' work is very delicate.

Training, Other Qualifications, and Advancement

Jewelers' skills usually are learned through informal on-the-job training. However, a limited number of formal courses are offered by industrial associations and technical schools.

Work in jewelry factories offers the best opportunities for persons to acquire all-round skills. In the precious jewelry industry the Amalgamated Jewelry, Diamond and Watchcase Workers Union and the manufacturers have established apprenticeships for many of the skilled occupations. Individuals who work in jewelry factories have the best chance to get such apprenticeships. The apprentices learn their trade through on-the-job training. Depending on the particular skill, apprenticeship programs for jewelry makers usually take from 3 to 4 years. For example, 3 years are required to become a colored-stone setter and 4 years to qualify as a diamond setter. All new apprentices receive the same starting wage and get periodic raises up to the minimum for their job. To overcome labor shortages in the modelmaking, moldmaking, and toolmaking occupations, manufacturers sponsor some courses in Providence, R.I. and New York City. These courses are intended for employees of jewelry manufacturers, and the tuition often is paid by the manufacturer.

Some technical schools offer instruction for 6 months to 3 years in watch and jewelry repair, and jewelry design and construction. These schools are a good source of training for someone outside the jewelry industry.

A high school education is desirable for young people entering the trade. Courses in art, mechanical drawing, and chemistry are particularly useful.

The precise and delicate nature of jewelry work requires finger and hand dexterity, good eye-hand coordination, patience, and concentration. Artistic ability is a major asset,

because jewelry is primarily a form of adornment.

In manufacturing, jewelers sometimes advance to supervisory jobs. Some jewelers open their own jewelry stores or repair shops.

A substantial financial investment and a great personal commitment are required to operate a jewelry store, because the field is highly competitive. Jewelers who plan to open their own stores should have experience in selling jewelry. Those who can repair watches have an advantage, because watch repair accounts for much of the business in small stores.

Employment Outlook

Employment of jewelers is expected to grow more slowly than the average for all occupations through the mid-1980's. Though the demand for jewelry will increase as population grows, and as rising incomes enable people to spend more on luxuries, improved production methods will enable jewelry factories to meet the increased demand without hiring additional employees. However, many job openings will occur each year as experienced workers retire, die, or transfer to other occupations. Because of a shortage of skilled jewelers, opportunities for people with training in jewelry construction, design, or repair should exist throughout the industry.

Earnings and Working Conditions

According to limited information available, earnings of experienced jewelers ranged from about $5 to $7 an hour in 1976. Those in business for themselves can earn more.

Most jewelers in stores and repair shops work 40 to 48 hours a week. Some in factories work 35 hours a week.

Skilled jewelers usually work in well-lighted and well-ventilated surroundings.

Sources of Additional Information

For information on job opportunities in jewelry manufacturing, contact:

The Jewelry Institute, 340 Howard Building, 155 Westminster St., Providence, R.I. 02903.

For information on job opportunities in jewelry stores, contact:

Retail Jewelers of America, 10 Rooney Circle West Orange, N.J. 07052.

For a list of technical schools offering training in jewelry design and construction, contact:

Jewelers Circular Keystone, Chilton Way, Radnor, Pa. 19089.

LOCKSMITHS

(D.O.T. 709.281)

Nature of the Work

Locksmithing is an ancient trade—so old, in fact, that archeologists have found evidence of key-operated wooden locks made for Egyptian royalty as early as 2000 B.C. For many centuries, the locksmith's talents were available to only the relatively few who could afford the locks of the day, which were sometimes elaborate, if none too foolproof. In 1861, the pin tumbler lock was invented and a mass-production method developed that made these locks nearly as common as doors themselves. The locksmith came into demand as never before.

Today's locksmiths spend much of their time helping people who have locked themselves out of their cars, homes, and businesses. If the key has been left inside the car or house, for example, they may simply pick the lock. If, on the other hand, the keys are lost, new ones must be made. To do this, locksmiths first will try to obtain identifying key code numbers so that they can cut duplicates of the original key. Code numbers for a car's keys, for example, may be obtained by consulting the dealer who sold the car, or by checking the owner's bill of sale. Keys also can be duplicated by impression. In this case, locksmiths place a blank key in the lock and, by following marks left on the blank, file notches in it until it works.

Combination locks offer a special challenge. Locksmiths sometimes open them by touch, that is, by rotating the dial and feeling the vibrations when the wheels come into place. If all else fails, a hole may be drilled through the lock to open it. Finally, locksmiths repair damaged locks by replacing tumblers, springs, and other parts.

An important part of the locksmith's job is to recommend security measures to customers. For example, they may advise a firm to rekey its locks periodically. To rekey, locksmiths change the locking mechanism to fit new key codes, thus making the old keys useless. Rekeying a master system is one of the most complicated and time-consuming jobs handled by a locksmith. In a master system, some keys must open all doors; others open various combinations (for example, all doors on one floor); still others are individual keys for each door.

Some locksmiths install and repair electronic burglar alarms and surveillance systems that signal police or firefighters when break-ins or fires occur. A basic knowledge of electricity and electronics is needed to install and repair these systems. Much of the work is done by specialists called protective-signal repairers, rather than by locksmiths.

Locksmiths use screwdrivers, pliers, tweezers, and electric drills in their work, as well as special tools such as lockpicks. They make original and duplicate keys on keycutting machines. To guide them in their work, they refer to manuals that describe the construction of various locks.

Places of Employment

Most of the estimated 10,000 locksmiths in 1976 worked for locksmith shops. Many operated their own businesses. Locksmith shops typically employ one to three locksmiths; few employ more than five. Some locksmiths worked in hardware and department stores that offered locksmith services to the public; others worked in government agencies and large industrial plants. A small number worked for safe and lock manufacturers.

Although most jobs will be found in big cities, locksmiths work in virtu-

Locksmith shops typically employ one to three locksmiths.

ally every part of the country. Locksmithing in small towns, however, is usually a part-time job, often combined with other work, such as fixing lawnmowers, guns, and bicycles.

Training, Other Qualifications, and Advancement

The skills of this trade are learned primarily through on-the-job training under experienced locksmiths. First, beginners may learn to duplicate keys and make keys from codes. Later, they learn to open, repair, and install locks, and finally, to work on safes. Generally, a beginner needs about 4 years of on-the-job training to qualify as a locksmith. Additional training is needed to service electronic security systems.

Formal training also is available in a few public and private schools that offer 1- to 2-year programs in locksmithing. Students are taught the basics of locksmithing such as repairing and opening locks. At some schools, students may specialize in safe repair or alarm systems. Completion of a course, however, does not assure a job; interested persons should check with local employers to make sure the school's training is acceptable.

Employers look for people who have mechanical aptitude, good hand-eye coordination, and manual dexterity. A neat appearance and a friendly, tactful manner also are important, since the locksmith has frequent contact with the public. Employers usually will not hire applicants who have been convicted of crimes.

Although high school graduates are preferred, many employers will hire applicants with less education. High school courses in machine shop, mechanical drawing, electronics, and mathematics are helpful. Completion of a correspondence school course in locksmithing increases the chances of getting a trainee job.

Many States and cities have licensing requirements. To obtain a license, the applicant generally must be fingerprinted and pay a fee. Some cities require that an individual pass a written or pratical examination. However, specific requirements vary from city to city. Information on licensing may be obtained from local governments.

To keep up with new developments in their field, locksmiths read monthly technical journals or attend training classes at the annual convention of Associated Locksmiths of America.

Locksmiths can advance to shop supervisors—positions found, however, only in the larger shops. Experienced locksmiths also can go into business for themselves with relatively little capital. Many do business from their homes.

Employment Outlook

Employment in this relatively small occupation is expected to grow faster than the average for all occupations through the mid-1980's. In addition to the need to fill new positions, a few hundred openings will arise each year as experienced locksmiths retire, die, or transfer to other occupations.

Employment of locksmiths is expected to increase as a result of population growth and a more security-conscious public. Also, many businesses feel that conventional locks and other security devices are not adequate and are having more complex equipment installed. Opportunities will be particularly favorable for locksmiths who know how to install and service electronic security systems. Use of such systems has expanded greatly in recent years, and still greater growth is expected in the future. Opportunities also will be favorable for locksmiths who are willing to work at night to handle emergencies.

Earnings and Working Conditions

Experienced locksmiths earned from about $4.60 to $7.50 an hour in early 1976, according to the limited information available; many self-employed locksmiths earned even more. Trainees usually started at about $2.50 an hour, with periodic raises during training.

Most locksmiths receive an hourly rate or weekly salary, although some work on a commission basis, receiving a percentage of the money they collect; their earnings depend on the amount of work available and how quickly they complete it.

Locksmiths generally work year round. Most work 40 to 48 hours a week; even longer hours are common among the self-employed. The locksmith may be called at night to handle emergencies, though in many shops the responsibility to be "on call" is rotated among the staff.

Locksmiths do considerable driving from job to job. At times, they must work outside in bad weather and occasionally work in awkward positions for long periods. However, locksmithing is cleaner work than that of most mechanical trades and is comparatively free from the danger of injury.

Sources of Additional Information

Details about training and work opportunities may be available from local locksmith shops and local offices of the State employment service. For a list of schools offering courses in locksmithing and general information about the occupation, contact:

Associated Locksmiths of America, Inc., 3003 Live Oak St., Dallas, Tex. 75204.

PIANO AND ORGAN TUNERS AND REPAIRERS

(D.O.T. 730.281, .381, and 829.281 and .381)

Nature of the Work

Pianos and organs are used to perform music ranging in style from contemporary "rock" to the classics of Bach. However, not even the greatest artist can overcome the handicap of an untuned instrument. Piano and organ tuners and repairers bring the notes of these instruments into harmony.

There are four different kinds of piano and organ tuners and repairers: Piano tuners, piano technicians, pipe organ technicians, and electronic organ technicians. According to their skills, they tune, repair, or rebuild pianos and organs. They usually begin their trade by learning how to tune these keyboard instruments.

Piano tuners (D.O.T. 730.381) adjust piano strings so that they will be in proper pitch and sound musically correct. There are approximately 220 strings in the standard 88-key piano. After muting the strings on either side, the tuner uses a tuning hammer (also called a tuning lever or wrench) to tighten or loosen the string being tested until its frequency matches that of a standard tuning fork. The other strings are tuned in relation to the starting string.

Sometimes the tuner has to make minor repairs, such as replacing worn or broken hammers. However, major repairs are made by piano technicians.

In addition to knowing how to tune a piano, *piano technicians* (D.O.T. 730.281) can detect and correct other problems that may affect its sound. Technicians talk with the customer to get an idea of what is wrong and then go to work to find out why. Once they find what the problem is, they make repairs or adjustments such as realigning hammers that do not strike the strings just right or replacing moth-eaten felt on the hammers. To dismantle and repair pianos, technicians use common handtools as well as special ones such as regulating tools, repinning tools, and key leveling devices.

Although organs and pianos look somewhat alike, they function differently, and few technicians work on both instruments. Moreover, organ technicians specialize in either electronic or pipe organs.

Piano tuner adjusting strings for proper pitch.

Pipe-organ technicians (D.O.T. 730.381) install, tune, and repair organs that make music by forcing air through one of two kinds of pipes—flue pipes or reed pipes. The tone in a flue pipe, like that in a whistle, is made by air forced through an opening. The reed pipe makes its tone by vibrating a brass reed in the air current.

Like piano tuners, organ technicians use their ears and tuning forks to put an organ in good voice. To tune a flue pipe, the technician moves a metal slide that increases or decreases the pipe's "speaking length." A reed pipe is tuned by adjusting the length of the reed. A day or more may be needed to finish one of these jobs, because most organs have hundreds of pipes. Some workers specialize only in tuning, and do not have the all-round skills of a technician.

Most pipe organs are very large and complex, and are assembled on-site in places like churches and auditoriums. Technicians install air chests, blowers, air ducts, organ pipes, and other components. They follow the designer's blueprints and use a variety of hand and power tools to assemble components. Technicians may work in teams or be assisted by helpers. A job may take several weeks or even months, depending on the size of the organ.

Technicians may also maintain organs on a regular basis, returning every 3 or 4 months to tune them and make other routine adjustments.

Electronic organ technicians (D.O.T. 829.281) have very different duties from those of pipe organ technicians. They use special electronic test equipment to tune and to check tone and amplification. Some electronic organs do not require tuning. Those that do are fairly simple to tune. However, these organs may break down due to loose connections, faulty transistors, dirty contacts, and other problems. When routine checks do not find the problem, technicians use meters and electronic devices to check suspected circuits. For example, they check voltages until an unusual or irregular measure shows up the part of the circuitry causing trouble. When they find the problem, they make repairs or adjustments, using soldering irons, wire cutters, and other handtools. Technicians often use wiring diagrams and service manuals that show connections within organs, provide adjustment information, and describe causes of trouble. Because of the large differences among various brands of electronic organs, many technicians service only a particular brand.

Places of Employment

About 8,000 persons worked as full-time piano and organ tuners and repairers in 1976; most worked on pianos. About two-thirds of the total worked in independent repair shops; many were the sole operators of small shops. Another one-fifth were employed by piano and organ dealers. Most of the rest worked for piano and organ manufacturers.

Piano and organ tuners and repairers are employed mostly in big cities and in States that have large populations. In towns too small to offer enough work for a full-time job in this field, piano and pipe organ work may be done part time by local music teachers and professional musicians. Similarly, electronic organ work may be done by television and radio repairers.

Training, Other Qualifications, and Advancement

Piano and organ tuners and repairers generally learn on the job. Dealers and repair shops hire beginners to do general cleanup work, help move and install instruments, and do other routine tasks. Helpers gradually learn to tune and to make simple repairs, and then take on more difficult jobs as they gain experience. Generally, 3 to 4 years of on-the-job training are needed to qualify as a piano, pipe organ, or electronic organ technician.

Piano and organ manufacturers train inexperienced workers to assemble instruments. However, because assembly is done in many steps, workers learn little about the instrument as a whole, and need additional training in tuning and repair work before they can qualify as technicians.

People interested in a career in piano or organ servicing should have good hearing, mechanical aptitude, and manual dexterity. Because service work frequently is done in the customer's home, a neat appearance and a pleasant, cooperative manner also are important. Ability to play the instrument helps, but is not essential as a qualification.

Employers prefer high school graduates for beginning jobs in these fields. Music courses help develop the student's ear for tonal quality. Courses in woodworking also are useful because many of the moving parts in pianos and pipe organs are made of wood. For jobs as electronic organ technician trainees, applicants usually need formal training in electronics available from technical schools, junior and community colleges, and some technical-vocational high schools. Training in electronics also is available in the Armed Forces.

Courses in piano technology, which may take up to 2 years to complete, are offered by a small number of technical schools and by a few 4-year colleges. Home study (correspondence school) courses in piano and organ technology also are available.

Piano and organ tuners and repairers keep up with new developments in their fields by studying trade magazines and manufacturers' service manuals. Most electronic organ manufacturers and the Piano Technicians's Guild conduct brief courses periodically to provide information on technical changes in their instruments.

Tuners and repairers who work for large dealers or repair shops can advance to supervisory positions. Most people in this field move up, however, by going into business for themselves. Relatively little capital is required beyond an initial investment in tools. Basic piano or pipe organ tools cost only a few hundred dollars. By contrast, tools and test equipment for electronic organs may cost a thousand dollars or more. Typically, self-employed tuners and repairers operate out of their own homes and use either a car or a small truck for service calls.

Employment Outlook

Little change in the employment of piano tuners, piano technicians, and pipe organ technicians is expected through the mid-1980's. Growth in the number of pianos and organs will be limited by competition from other forms of entertainment and recreation. Nevertheless, some jobs will open each year as experienced workers retire, die, or transfer to other occupations. Nearly all openings will be for piano tuners and technicians.

The continued growth in popularity of the electronic organ, a comparatively new instrument, is expected to produce a moderate increase in jobs for electronic organ technicians. However, this is a very small occupation and the number of job openings will be far fewer than for piano tuners and technicians.

Opportunities for beginners will be best in piano and organ dealerships and large repair shops. Many repair shops are too small to afford a full-time helper, although they may hire one helper part time.

Earnings and Working Conditions

Experienced workers earned from $5 to $10 an hour in 1976, depending on their level of skill and where they worked, according to limited information. Beginning rates for helpers ranged from $3 to $5 an hour.

Many self-employed tuners and repairers earned more than $12,000 a year, and earnings in excess of $15,000 a year were not uncommon. Earnings of the self-employed depend on the size of the community, their ability to attract and keep customers, their operating expenses, and competition from other tuners and repairers.

Service business increases with cold weather because at that time people spend more time indoors playing the piano or organ. Consequently, during fall and winter, many tuners and repairers work more than 40 hours a week. As business falls off during spring and summer, shops may take up the slack by reconditioning or rebuilding old instruments. Self-employed tuners and repairers frequently work evenings and weekends to suit their customers.

The work is relatively safe, although tuners and repairers may suffer small cuts and bruises when making repairs. Electrical shock is a minor hazard for electronic organ technicians but it has rarely caused serious injury. Work is performed in shops and homes and public buildings such as churches and schools where working conditions usually are pleasant.

Sources of Additional Information

Details about job opportunities may be available from local piano and organ dealers and repair shops. For general information about piano technicians and a list of schools offering courses in piano technology, write to:

Piano Technicians Guild, Inc., P.O. Box 1813, Seattle, Wash. 98111.

SHOE REPAIRERS

(D.O.T. 365.381)

Nature of the Work

People like their shoes to look nice and be in good condition. Keeping them that way is the job of the shoe repairer.

Shoe repairers spend most of their time replacing worn soles and heels. They remove worn soles and old stitching, and "rough" the bottom of the shoes on sanding wheels. They select precut soles or cut them from pieces of leather; they then cement, nail, or sew the soles to the shoes. Finally, they trim the soles. To reheel shoes, repairers pry off old heels, select replacement heels or cut them to shape, and cement and nail them into place. After the heels and soles have been replaced, repairers stain and buff them to match the color of the shoes.

Shoe repairers also replace insoles, restitch loose seams, and restyle old shoes by changing heels or dyeing uppers. Highly skilled repairers may design, make, or repair orthopedic shoes according to doctors' prescriptions. Repairers also may mend handbags, luggage, tents, and other items made of leather, rubber, or canvas. They also replace zippers, dye handbags, and stretch shoes to conform to the foot.

In large shops, repair work sometimes is divided into a number of specialized tasks. For example, some repairers only remove and replace heels and soles; others only restitch torn seams.

Shoe repairers use power-operated sole-stitchers and heel-nailing machines, and manually operated sewing machines. Among the handtools they use are hammers, awls, nippers, and skivers (a special tool for splitting pieces of leather).

Self-employed shoe repairers have managerial responsibilities in addition to their regular duties. They estimate repair costs, keep records, and supervise other repairers.

Places of Employment

About 25,000 shoe repairers were employed in 1976. About one-half of them owned shoe repair shops, many of which were small, one-person operations. Most of the remaining repairers worked in large shoe shops. Some repairers worked in shoe stores, department stores, and drycleaning shops. A small number were employed in shoe manufacturing, to repair shoes damaged in production. These workers generally are less skilled than those who work in repair shops.

All cities and towns and many very small communities have shoe repair shops. Employment, however, is concentrated in large cities.

Training, Other Qualifications, and Advancement

Most shoe repairers learn on the job as helpers to experienced repairers. Helpers begin by assisting experienced repairers with simple tasks, such as staining, brushing, and shining shoes. As they gain experience, trainees learn to replace heels and soles, to estimate the cost of repairs, and to deal with customers. Helpers usually become fully skilled in 2 to 3 years.

Shoe repairer "roughs" bottom of shoe before attaching new sole.

Some repairers learn the trade at vocational schools. Applicants to vocational schools usually must have a high school diploma. In addition to learning shoe repairing, vocational school students attend classes in business administration. The programs last from 6 months to 2 years. Graduates often are encouraged to gain additional training by working with experienced shoe repairers.

Shoe repairers must have manual dexterity and mechanical aptitude to work with various machines and handtools. They must be able to work alone with little supervision. Shoe repairers need patience to perform the work and deal with customers. Repairers who own shops must have a working knowledge of basic arithmetic to maintain records.

Advancement opportunities for shoe repairers are limited. Many open their own shops and some who are employed in large shops become supervisors.

Employment Outlook

Employment of shoe repairers is not expected to change significantly through the mid-1980's. Nevertheless, numerous job openings are expected each year in this relatively small occupation, because of the need to replace experienced shoe repairers who retire, die, or leave the field for other reasons. Job opportunities should be very good because few people are attracted to this occupation. Opportunities should be especially good for experienced repairers who wish to open their own shops.

In recent years, employment of shoe repairers has declined because new shoes were relatively inexpensive and many people bought new shoes instead of having old ones fixed. This reduced the need for shoe repairs and repairers. The popularity of cushion-soled shoes and other casual footwear which usually are not practical to repair also limited the demand for these workers. However, shoe repairer employment is expected to remain about the same in the future. Expected shoe price increases should reduce the practice of replacing worn shoes with new shoes and should stimulate the demand for repairs.

Earnings and Working Conditions

Information from a limited number of employers indicates that shoe repairers earned between $3 and $4 an hour in 1976. Inexperienced trainees generally earned between $2.30 and $2.50 an hour. Some highly skilled repairers, including managers of shoe repair shops, earned more than $300 a week.

Shoe repairers generally work 8 hours a day, 5 days a week. The workweek for the self-employed is often longer, sometimes 10 hours a day, 6 days a week. Although shoe repair shops are busiest during the spring and fall, work is steady with no seasonal layoffs.

Because many shoe repairers own shops, working conditions are determined by the repairer. Large shops are usually comfortable, but small shops may be crowded and noisy and have poor light or ventilation. Strong odors from leather goods, dyes, and stains may be present.

The work is not strenuous and there are few hazards. However it does require stamina, because repairers must stand much of the time.

Sources of Additional Information

Information about training opportunities may be obtained from:

Shoe Service Institute of America, 222 W. Adams St., Chicago, Ill. 60606.

Information about work opportunities is available from State employment service offices, as well as shoe shops in the community.

TELEVISION AND RADIO SERVICE TECHNICIANS

(D.O.T. 720.281)

Nature of the Work

Television and radio service technicians repair a large and growing number of electronic products, of which television sets and radios are the most numerous. They also repair stereo components, tape recorders, intercoms, and public address systems. Some service technicians specialize in repairing one kind of equipment—for example, television sets or car radios.

Equipment may operate unsatisfactorily or break down completely because of faulty tubes or transistors, poor connections, or other problems. Service technicians check and evaluate each possible cause of trouble; they begin by checking for the most common cause—tube or module failure. In other routine checks, they look for loose or broken connections and for parts that are charred or burned.

When routine checks do not locate the trouble, technicians use test equipment, such as voltmeters, oscilloscopes, and signal generators, to check suspected circuits. For example, they may measure voltages or wave forms in a television set until an unusual or irregular measurement indicates the faulty part. Once the cause of trouble is found, they replace faulty parts and make adjustments, such as focusing and converging the picture or correcting the color balance.

Technicians who make customer service calls carry tubes, modules, and other parts that can be easily replaced in the customer's home. Radios, portable television sets, and other small equipment usually are repaired in service shops. Large television sets also are repaired in shops when the trouble must be located with complex test equipment.

Service technicians use screwdrivers, pliers, wire cutters, soldering irons, and other handtools. They refer to wiring diagrams and service manuals that show connections and provide information on how to locate problems and make repairs.

TV and radio service technicians use various instruments to locate faulty operations.

Places of Employment

About 114,000 people worked as radio and television service technicians in 1976. About one-quarter of them were self-employed, a much larger proportion than in most skilled trades. Two-thirds of all service technicians, either self-employed or working for others, worked in shops and stores that sell or service television sets, radios, and other electronic products.

Television and radio service technicians work in almost every city. Geographically, employment is distributed in much the same way as the Nation's population.

Training, Other Qualifications, and Advancement

Training and experience in electronics are required in order to become a skilled television and radio service technician. Technical, vocational, or high school training in electronics, mathematics, schematic reading, and physics may provide a good background for entering the field. The military services offer training and work experience that are very useful in civilian electronics work. Correspondence school courses also are helpful.

Up to 2 years of technical training in electronics plus 2 to 4 years of on-the-job experience usually are required to become a fully qualified service technician. People who have no previous technical training may be hired as helpers or apprentices if they show aptitude for the work or, like the amateur "ham" radio operator, have a hobby in electronics. An apprenticeship program lasts about 4 years and may include home study. The apprentice must work with a fully qualified service technician who is responsible for his work.

An important part of the service technician's training is provided by many manufacturers, employers, and trade associations. They conduct training programs to keep service technicians abreast of the latest servicing methods for new models or

products. Technicians also keep up with technical developments by studying manufacturers' service manuals and technical magazines and by attending training seminars. Technicians who work for large companies work mainly on that companies products and so are more familiar with certain brands.

Television and radio service technicians must know how electronic components and circuits work. Other essential qualifications include the ability to manipulate small parts and tools, good eye-hand coordination, normal hearing, good eyesight and color vision, and an ability to work with people.

Service technicians who work in large repair shops may be promoted to supervisor or service manager. Technicians who have sufficient funds may open their own sales and service shops. Some technicians obtain jobs as electronic "trouble shooters" or technicians in manufacturing industries or government agencies.

People interested in advancing to positions such as electronics technician can improve their opportunities by taking trade school, correspondence, or technical institute courses in automatic controls, electronic engineering, television engineering, and mathematics. Those planning to go into business for themselves should take some business administration courses, particularly accounting and consumer relations.

A growing number of States require radio and television technicians to be licensed. To obtain a license, applicants must pass an examination designed to test their knowledge of electronic circuits and components and their skill in the use of testing equipment.

Employment Outlook

Employment of television and radio service technicians is expected to increase faster than the average for all occupations through the mid-1980's. In addition to openings from employment growth, many openings will result each year from the need to replace experienced technicians who retire, die, or change occupations.

Employment of service technicians is expected to increase in response to the growing number of radios, television sets, phonographs, tape recorders, and other home entertainment products, despite the improvements in technology making repair of these products less necessary. Rising population and personal incomes will contribute to this growth. Nearly all households have at least one television set, and the number of households with two sets or more is expected to increase significantly, mainly because of the growing demand for color and portable sets. Greater use of electronic products for purposes other than entertainment also is expected; for example, closed-circuit television, two-way radios, calculators, home appliances, and various medical electronic devices. Closed-circuit television is being used increasingly to monitor production processes in manufacturing plants and to bring educational programs into classrooms.

People who enter the occupation should have steady work because the television and radio repair business is not very sensitive to changes in economic conditions.

Earnings and Working Conditions

Earnings of television and radio service technicians ranged from $3.50 to $7.50 an hour in 1976, based on the limited information available. The wide variations in wage rates reflect differences in skill level, type of employer, and geographic location.

Television and radio service technicians employed in local service shops or dealer service departments usually work 40 to 48 hours a week.

Service on television, radio, and other home entertainment products is performed in shops and homes, where working conditions usually are pleasant. Some physical strain is involved in lifting and carrying equipment. Hazards include electrical shock and the risk of falling from roofs while installing or repairing antennas.

Some service technicians are members of labor unions. Most of them belong to the International Brotherhood of Electrical Workers.

Sources of Additional Information

For more information about jobs in this field, contact local shops and stores that service television sets and radios and other electronic equipment. Technical and vocational schools that offer courses in television and radio repair or electronics may provide information about training. In addition, the local office of the State employment service may have information about programs that provide training opportunities.

Information about the work of television and radio service technicians is available from locals of the International Brotherhood of Electrical Workers and from:

National Alliance of Television and Electronic Service Associations, 5908 S. Troy St., Chicago, Ill. 60629.

Electronics Industries Association, 2001 Eye St. NW., Washington, D.C. 20006.

WATCH REPAIRERS

(D.O.T. 715.281)

Nature of the Work

As the pace of modern living quickens, people become more conscious of time and more dependent on watches and clocks to keep appointments and complete tasks. Cleaning, repairing, and adjusting these devices is the job of watch repairers or, as they are frequently called, watchmakers.

When a watch is not working properly, repairers use tweezers, screwdrivers, and other tools to remove the watch from its case and disassemble the movement. With the aid of a special magnifying glass called a loupe, they carefully examine each part of the mechanism.

Repairers may replace the mainspring and other parts of the winding mechanism of a mechanical watch or the battery of an electronic watch. They may adjust improperly fitted wheels, and replace broken hands or a cracked watch crystal. Before reas-

sembling the watch, watch repairers clean and oil its parts, then test its accuracy with a timing machine.

In addition to handtools, watch repairers use timing and cleaning machines. They use electrical test equipment when repairing electronic watches to make sure that circuits work properly.

Watch repairers who own jewelry stores may do jewelry repair and sell watches, jewelry, silverware, and other items. They also may hire and supervise salesclerks, other watch repairers, and jewelers; arrange window displays; purchase goods to be sold; and perform other managerial duties.

Places of Employment

About 21,000 persons worked as watch repairers in 1976. One-third were self-employed. Most watch repairers worked in jewelry stores or repair shops, which are located throughout the country. A small number had jobs in factories that make watches, clocks, or other precision timing instruments.

Training, Other Qualifications, and Advancement

Most people learn the trade in watch repair schools; others learn through formal apprenticeship or informal on-the-job training arrangements.

There generally are no specific educational requirements for entrance into watch repair schools although most students are high school graduates. Some schools test a student's mental aptitude and manual dexterity. Most schools charge tuition and require students to furnish their own handtools. Courses last from 1 to 3 years for full-time students. Students learn to use and care for the watch repairer's tools and machines, make and adjust individual parts, take apart and reassemble various kinds of watch and clock movements, and diagnose and solve repair problems. Some schools offer courses on repairing unusual types of timepieces, such as chronographs and timers.

Some watch repairers learn the trade through formal apprenticeships. Apprentices should have a high school diploma. They receive some classroom instruction in watch technology, however, most of their training is conducted on-the-job. The training is structured in much the same way as the technical school courses. Apprenticeships last 3 to 4 years. Instructing an apprentice requires a great deal of time; for this reason many watch repairers are reluctant to employ a trainee. Only 100 apprenticeships were registered with the Department of Labor in 1975.

A few watch repairers acquire their skills through informal on-the-job arrangements with experienced workers. This type of training is less structured than apprenticeship, and classroom instruction is not required. Trainees learn by observing experienced repairers and by performing simple and then more complex repairs. On-the-job training lasts longer than technical school or apprenticeship.

The following States require watch repairers to obtain a license: Florida, Indiana, Iowa, Kentucky, Louisiana, Michigan, Minnesota, North Carolina, North Dakota, Oregon, and Wisconsin. To obtain a license, repairers must pass an examination designed to test their skill with tools and their knowledge of watch construction and repair.

Watch repairers in all States can demonstrate their competence by passing certification examinations given by the American Watchmakers Institute. Tests are given for the title of either Certified Watchmaker or Certified Master Watchmaker. Annual voluntary examinations covering new phases of watchmaking also are offered and those who pass are given a plaque of recognition.

A person planning a career as a watch repairer must be willing to sit for long periods and work with a minimum of supervision. The precise and delicate nature of the work requires patience and concentration. Since a watch is simply a small machine, mechanical aptitude is essential. Good depth perception and eye-hand coordination are essential in working with the tiny parts.

Watch repairers who have sufficient experience and funds may open their own watch repair shops. Watch repairers also may open their own

Watch repair work requires patience and concentration.

jewelry stores where they can increase their income by selling watches and other merchandise in addition to repairing watches. These stores require a much greater financial investment than do repair shops, because an inventory of expensive merchandise must be obtained.

Employment Outlook

Employment of watch repairers is expected to grow at a slower rate than the average for all occupations through the mid-1980's. Most job openings will result from the need to replace experienced repairers who retire, die, or leave the occupation for other reasons. Job opportunities should be very good for trained watch repairers.

Although more watches will be sold as population and incomes rise, many will be inexpensive watches that cost little more to replace than repair. Consequently, employment is not expected to keep pace with growth in the number of watches. Furthermore, the increasing popularity of solid-state digital watches may lower the need for watch repairers. These watches have no moving parts and usually are serviced by factory technicians instead of watch repairers. However, in recent years job openings have exceeded the number of trained workers entering the occupation. If this gap continues, trained workers should find jobs readily available. Opportunities are expected to be particularly good for graduates who have had training in repairing electronic watches because these watches are growing in popularity.

Earnings and Working Conditions

Earnings of watch repairers in entry jobs generally ranged from about $150 to $200 for a 40-hour week in 1976, based on the limited information available. Experienced watch repairers working in retail stores and repair shops received from $275 to $350 for a 40-hour week. Some watch repairers may be paid a commission based on the number of watches repaired. Others rent space in a jewelry store set up a repair department, and split the profits with the store owner. Watch repairers who are paid commission or own their own businesses can earn considerably more than those working for a salary.

Watch repairers often work longer than the standard 40-hour week. Those who are self-employed or located in small communities often work a 48-hour week or longer. The work involves little physical exertion, however, and generally is performed in comfortable surroundings.

Sources of Additional Information

For information about training courses and watch repairing as a career, contact:

American Watchmakers Institute, P.O. Box 11011, Cincinnati, Ohio 45211.

For information about job opportunities in retail stores contact:

Retail Jewelers of America, Inc., 10 Rooney Circle, West Orange, N.J. 07052.

Further information about work opportunities or training in this trade also is available from local offices of the State employment service.

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What to Look For in this Reprint

To make the *Occupational Outlook Handbook* easier to use, each occupation or industry follows the same outline. Separate sections describe basic elements, such as work on the job, education and training needed, and salaries or wages. Some sections will be more useful if you know how to interpret the information as explained below.

The TRAINING, OTHER QUALIFICATIONS, AND ADVANCEMENT section indicates the preferred way to enter each occupation and alternative ways to obtain training. Read this section carefully because early planning makes many fields easier to enter. Also, the level at which you enter and the speed with which you advance often depend on your training. If you are a student, you may want to consider taking those courses thought useful for the occupations which interest you.

Besides training, you may need a State license or certificate. The training section indicates which occupations generally require these. Check requirements in the State where you plan to work because State regulations vary.

Whether an occupation suits your personality is another important area to explore. For some, you may have to make responsible decisions in a highly competitive atmosphere. For others, you may do only routine tasks under close supervision. To work successfully in a particular job, you may have to do one or more of the following:

- motivate others
- direct and supervise others
- work with all types of people
- work with things—you need good coordination and manual dexterity
- work independently—you need initiative and self-discipline
- work as part of a team
- work with details, perhaps numbers or laboratory reports
- help people
- use creative talents and ideas
- work in a confined area
- do physically hard or dangerous work
- work outside in all types of weather

A counselor can help you find out more about your interests and abilities so you can judge whether a job's characteristics suit you.

The EMPLOYMENT OUTLOOK section tells whether or not the job market is likely to be favorable. Usually an occupation's expected growth is compared to the average projected growth rate for all occupations (20.1 percent between 1976 and 1985). The following phrases are used:

Much faster	50% or more
Faster	25.0 to 49.9%
About as fast	15.0 to 24.9%
Slower	4.0 to 14.9%
Little change	3.9 to -3.9%
Decline	-4.0% or more

Generally, job opportunities are favorable if employment is growing at least as fast as for the economy as a whole.

But, you would have to know the number of people competing with you to be sure of your prospects. Unfortunately, this supply information is lacking for most occupations.

There are exceptions, however, especially among professional occupations. Nearly everyone who earns a medical degree, for example, becomes a practicing physician. When the number of people pursuing relevant types of education and training and then entering the field can be compared with the demand, the outlook section indicates the supply/demand relationship as follows:

Excellent	Demand much greater than supply
Very good	Demand greater than supply
Good or favorable	Rough balance between demand and supply
May face competition	Likelihood of more supply than demand
Keen competition	Supply greater than demand

Competition or few job openings should not stop your pursuing a career that matches your aptitudes and interests. Even small or overcrowded occupations provide some jobs. So do those in which employment is growing very slowly or declining.

Growth in an occupation is not the only source of job openings because the number of openings from turnover can be substantial in large occupations. In fact, replacement needs are expected to create 70 percent of all openings between 1976 and 1985.

Finally, job prospects in your area may differ from those in the Nation as a whole. Your State employment service can furnish local information.

The EARNINGS section tells what workers were earning in 1976.

Which jobs pay the most is a hard question to answer because good information is available for only one type of earnings—wages and salaries—and not even this for all occupations. Although 9 out of 10 workers receive this form of income, many earn extra money by working overtime, night shifts, or irregular schedules. In some occupations, workers also receive tips or commissions based on sales or service. Some factory workers are paid a piece rate—an extra payment for each item they make.

The remaining 10 percent of all workers—the self-employed—includes people in many occupations—physicians, barbers, writers, and farmers, for example. Earnings for self-employed workers even in the same occupation differ widely because much depends on whether one is just starting out or has an established business.

Most wage and salary workers receive fringe benefits, such as paid vacations, holidays, and sick leave.

Workers also receive income in goods and services (payment in kind). Sales workers in department stores, for example, often receive discounts on merchandise.

Despite difficulties in determining exactly what people earn on the job, the Earnings section does compare occupational earnings by indicating whether a certain job pays more or less than the average for all nonsupervisors in private industry, excluding farming.

Each occupation has many pay levels. Beginners almost always earn less than workers who have been on the job for some time. Earnings also vary by geographic location but cities that offer the highest earnings often are those where living costs are most expensive.

What's an ad for the OOQ doing in a place like this?

The career information contained in the reprint you are reading was taken from the 1978-79 edition of the Occupational Outlook Handbook. But the Handbook is not the only source of useful career information published by the Bureau of Labor Statistics. The Handbook's companion, the Occupational Outlook Quarterly, is published four times during the school year to keep subscribers up to date on new occupational studies completed between editions of the Handbook. The Quarterly also gives practical information on training and educational opportunities, salary trends, and new and emerging jobs—just what people need to know to plan careers.

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